supported by either a specific asserted utility or a well established utility, one skilled in the art clearly would not know how to use the claimed invention.

REMARKS

1. The objections to the drawings have been noted and corrections will be made as required.

2. An Abstract of the Invention on a separate page is enclosed, as required.

3. Claims 1, 2, 22 and 26 have been amended to delete nonelected inventions.

4. Claim 18 has been amended as required.

5. Claims 1-4, 8, 12-18, 22 and 26 have been rejected under 35 USC § 112, first paragraph, for lack of enablement, i.e. requirement for deposit. There appears to be some confusion resulting from the language of claims 1, 8, 22 and 26 which recite "cDNA clones" contained in Gen Bank accessions and implying biological material having been deposited. As is well known, Gen Bank accessions are sequences, not biological

materials, and said claims have been amended to reflect that practice. In addition, it is stated in the Specification on page 10 of the section entitled "Detailed Description" that the "DNA sequence of the exemplary β-galactosidase II cDNA clone of the invention, which was determined from a cDNA clone, pZBG2-1-4, encoding β-galactosidase II, is recorded in GenBank as Accession Number AF020390." Deposits made under the Budapest Treaty are believed to be for biological materials, not for gene sequences, therefore such would not apply in this case. In addition, it is believed that, since the entire sequence has been disclosed and is publicly available, the claims to the recorded sequences are thereby fully enabled. Moreover, by following the information contained in the specific examples beginning on page 24 of the specification, one of skill in the art would be fully capable of isolating the disclosed sequences. It is thus respectfully requested that the rejection of the claims under 35 USC § 112, first paragraph, be withdrawn.

6. Claims 1-4, 8, 12-18, 22 and 26 have been rejected under 35 USC § 112, second paragraph, for indefiniteness.

Claims 1, 4 and 22 are indefinite with respect to the metes and bounds of the mature β-galactosidase II. The native mature protein occurs at positions 24 through 274 of the complete

protein, however, as discussed on pages 14-15 of the specification, "cleavage of a secreted protein is not entirely uniform", therefore additional amino acids may occur at either end. Further analysis of enzyme function using yeast to express protein has shown that additional amino acids do not interfere with enzyme function or activity (Smith and Gross. *Plant Physiology*. 2000. vol. 123, p. 1173).

Claim 12 has been amended to include specific hybridization conditions, as suggested.

The remaining concerns of the Examiner appear to be related to matters of form, and it is believed that these matters have been corrected by amendment and the cancellation of claim 13. It is therefore respectfully requested that the rejection be withdrawn.

7. Claims 1, 12-18 and 22 have been rejected under 35 USC § 102(b) as being anticipated by Ross. It is well-established that, in order for a reference to be applied under § 102, that reference must meet each and every element of the claim to which it has been applied. Ross discloses the isolation of a β-galactosidase from apple. In addition, an apple cDNA clone was also obtained using asparagus cDNA as a probe. The instant claims recite a polynucleotide having a sequence at least 95%

identical to the nucleotide sequence encoding tomato β-galactosidase II polypeptide, both the complete and the mature polypeptides. Since, as pointed out by applicants in the specification, apple and tomato have only a 67.6% shared identity, the Ross reference does not meet the requirements for application to the claims under § 102. With respect to the complementary sequences of paragraph (c), applicants have amended the claims as recommended by the Examiner. It is therefore believed that the rejection has thus been overcome, and it is requested that the rejection be withdrawn.

8-9. Claims 1-4, 8, 12-18, 22 and 26 have been rejected under 35 USC § 101 and 35 USC § 112, first paragraph, because the claimed invention lacks a specific asserted utility or a well established utility. The Examiner's attention is drawn to pages 7-8 and 34-36 where specific examples of utility are provided. The most important utility is the use of the TBG4 sequence in an antisense construct to transform tomato fruit for suppression of mRNA. Experimental evidence showed that increased fruit firmness was associated with a reduction in TBG4 mRNA, and firmer fruit is expected to result in less damage during shipping of fruit, the ability to harvest at a later stage for better flavor at market, and longer shelf life. Subsequent studies carried out have

further demonstrated the usefulness of the invention and are described in Gross et al. (2002. *Plant Physiology*. vol. 123, p. 1173).

With respect to the rejection under 35 USC § 112, first paragraph, the use of antisense constructs in transformation processes is a well established procedure and well within the level of skill in the art. In addition, applicants have provided considerable discussion of how to use the invention both in the Detailed Description section of the specification (for example, pages 17-18 and 22-24) as well as the specific Examples.

It is therefore believed that the requirements of 35 USC §§ 101 and 112, first paragraph, have been fully met.

For the Examiner's convenience, copies of the references cited hereinabove are enclosed. They have not been supplied with an Information Disclosure Statement (with its accompanying fees) or listed on a form PTO-1449 because they do not: (1) establish a *prima facie* case of unpatentability, or (2) refute any position taken by applicants, as defined by 37 CFR 1.56(b).

In view of the above amendments and remarks, it is believed that the instant application is now in condition for allowance. Accordingly, it is respectfully requested that the objections and rejections be withdrawn and the instant application allowed to issue. If any issues remain to be resolved, the Examiner is invited to telephone the undersigned at the number below.

Respectfully submitted,

February 27, 2003
Date

Janelle S. Graeter, Patent Advisor
Registration No. 35,024
USDA-ARS-OTT
5601 Sunnyside Ave., Rm. 4-1159
Beltsville, Maryland 20705-5131
Telephone: (301) 504-5676

Enclosures (2)
cc:
J. Fado
K. Gross

****
* I hereby certify that this correspondence is being deposited *
* with the United States Postal Service as first class mail in *
* an envelope addressed to: Assistant Commissioner for Patents, *
* Washington, DC 20231, on February 27, 2003 *
* (Date) *
* Gross et al. *
* (Name of applicant, assignee, or Registered Representative) *
* *
* (Signature) 2-27-03 (Date) *
****

Version with Markings to Show Changes Made

1 (Amended). An isolated nucleic acid molecule comprising a polynucleotide having a nucleotide sequence at least 95% identical to a sequence selected from the group consisting of:

(a) a nucleotide sequence encoding the tomato β-galactosidase II polypeptide having the complete amino acid sequence [selected from the group consisting] of [SEQ ID NO: 8, SEQ ID NO: 9, SEQ ID NO: 10,] SEQ ID NO: 11[, SEQ ID NO: 12, SEQ ID NO: 13, SEQ ID NO: 14, SEQ ID NO: 15 and SEQ ID NO: 16] and designated [TBG1, TBG2, TBG3,] TBG4[, TBG5, TBG6 and TBG7, respectively as shown in Figure 2 or as] and encoded by the cDNA sequence [clone selected from the group consisting of cDNA clones] contained in Gen Bank Accession No.[AF023847, AF154420, AF154421,] AF020390[, AF154423, AF154424 and AF154422];

(b) a nucleotide sequence encoding the mature tomato β-galactosidase II polypeptide having the amino acid sequence [at] from about position[s] 24[-] to about position 724 [selected from the group consisting] of the sequence of [SEQ ID NO: 8, SEQ ID NO: 9, SEQ ID NO: 10,] SEQ ID NO: 11[, SEQ ID NO: 12, SEQ ID NO: 13, SEQ ID NO: 14, SEQ ID NO: 15 and SEQ ID NO: 16] and designated [TBG1, TBG2, TBG3,] TBG4[, TBG5, TBG6 and TBG7, respectively as shown in Figure 2 or as] and encoded by the cDNA sequence [clone selected from the group consisting of cDNA clones] contained in Gen Bank Accession No. AF023847, AF154420,

AF154421,] AF020390[, AF154423, AF154424 and AF154422]; and

(c) a nucleotide sequence fully complementary to [any] either of the nucleotide sequences in (a) or (b), above.

2 (Amended). The nucleic acid molecule of claim 1 wherein said polynucleotide has the complete nucleotide sequence [selected from the group consisting] of [SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3,] SEQ ID NO: 4[, SEQ ID NO: 5, SEQ ID NO: 6 and SEQ ID NO: 7 as shown in Figure 2].

3 (Amended). The nucleic acid molecule of claim 1 wherein said polynucleotide has the nucleotide sequence [in Figure 2 (] of SEQ ID NO: 4[)] encoding the β-galactosidase II polypeptide having the amino acid sequence designated TBG4 [in Figure 2}.

4 (Amended). The nucleic acid molecule of claim 1 wherein said polynucleotide has the nucleotide sequence [in Figure 2 (] of SEQ ID NO: 4[)] encoding the mature polypeptide having the amino acid sequence from about 24 to about 724 in the amino acid sequence designated TBG4 [in Figure 2].

8 (Amended). The nucleic acid molecule of claim 1 wherein said polynucleotide has the complete nucleotide sequence of the cDNA [clone] sequence contained in Gen Bank Accession No. AF020390.

12 (Amended). An isolated nucleic acid molecule comprising a polynucleotide which hybridizes under stringent hybridization conditions to a polynucleotide having a nucleotide sequence identical to [a] the nucleotide sequence in (a), (b), or (c) of claim 1, wherein said polynucleotide which hybridizes does not hybridize under stringent hybridization conditions to a polynucleotide having a nucleotide sequence consisting of only A residues or of only T residues, and wherein stringent hybridization conditions are overnight incubation at 42°C in a solution comprising 50% formamide, 5 X SSC (150 mM NaCl, 15 mM trisodium citrate), 50 mM sodium phosphate (pH 7.6), 5 X Denhardt's solution, 10% dextran sulfate and 20 μg/ml denatured, sheared salmon sperm DNA, followed by washing in 0.1 X SSC at about 65°C.

14 (Amended). A method for making a recombinant vector comprising inserting [an] the isolated nucleic acid molecule of claim 1 into a vector.

18 (Amended). A recombinant method for producing a β-galactosidase II polypeptide, comprising culturing the recombinant host cell of claim 17 under conditions such that said polypeptide is expressed and recovering said polypeptide.

22 (Amended). An isolated nucleic acid molecule [nucleic acid molecule] comprising a polynucleotide having a nucleotide sequence at least 95% identical to a sequence selected from the group consisting of:

(a) a nucleotide sequence encoding the tomato β-galactosidase II polypeptide having the complete amino acid sequence [selected from the group consisting] of [SEQ ID NO: 8, SEQ ID NO: 9, SEQ ID NO: 10,] SEQ ID NO: 11[, SEQ ID NO: 12, SEQ ID NO: 13, SEQ ID NO: 14, SEQ ID NO: 15 and SEQ ID NO: 16] and designated [TBG1, TBG2, TBG3,] TBG4[, TBG5, TBG6 and TBG7, respectively as shown in Figure 3 or as] and encoded by the cDNA sequence [clone selected from the group consisting of cDNA clones] contained in Gen Bank Accession No. [AF023847, AF154420, AF154421,] AF020390[, AF154423, AF154424 and AF154422];

(b) a nucleotide sequence encoding the mature tomato β-galactosidase II polypeptide having the amino acid sequence [at] from about position[s] 24[-] to about position 724 [selected from the group consisting] of the sequence[s] of [SEQ ID NO: 8, SEQ ID NO: 9, SEQ ID NO: 10,] SEQ ID NO: 11[, SEQ ID NO: 12, SEQ ID NO: 13, SEQ ID NO: 14, SEQ ID NO: 15 and SEQ ID NO: 16] and designated [TBG1, TBG2, TBG3,] TBG4[, TBG5, TBG6 and TBG7, respectively as shown in Figure 3 or as] and encoded by the cDNA sequence[clone selectee from the group consisting of cDNA clones] contained in Gen Bank Accession No. [AF023847, AF154420,

AF154421,] AF020390[, AF154423, AF154424 and AF154422]; and

(c) a nucleotide sequence fully complementary to [any] either of the nucleotide sequences in (a) or (b), above.

26 (Amended). The nucleic acid molecule of claim 22 wherein said polynucleotide has the complete nucleotide sequence of the cDNA [clone] sequence contained in [an] Gen Bank Accession No. [selected from the group consisting of ATCC Deposit No. selected from the group consisting of AF023847, AF154420, AF154421,] AF020390[, AF154423, AF154424 and AF154422].

Cancel claim 13.

Enter the ABSTRACT OF THE INVENTION enclosed on a separate page.